

International
IR Rectifier

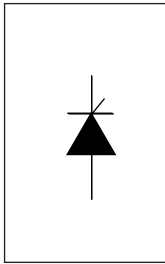
SAFEIR Series
16TTS..

PHASE CONTROL SCR

Description/Features

The 16TTS.. **SAFEIR** series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125° C junction temperature.

Typical applications are in input rectification (soft start) and these products are designed to be used with International Rectifier input diodes, switches and output rectifiers which are available in identical package outlines.



$$V_T < 1.4V @ 10A$$

$$I_{TSM} = 200A$$

$$V_{RRM} = 800 \text{ to } 1600V$$

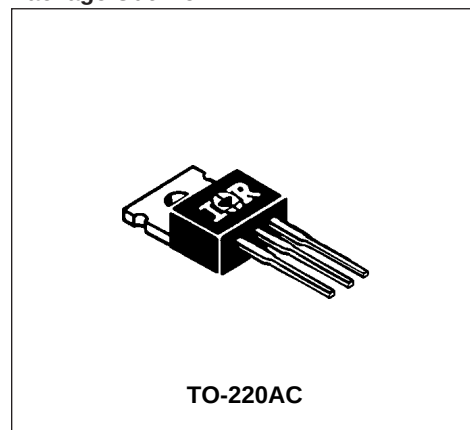
Output Current in Typical Applications

Applications	Single-phase Bridge	Three-phase Bridge	Units
Capacitive input filter $T_A = 55^\circ\text{C}$, $T_J = 125^\circ\text{C}$, common heatsink of 1°C/W	13.5	17	A

Major Ratings and Characteristics

Characteristics	16TTS..	Units
$I_{T(AV)}$ Sinusoidal waveform	10	A
I_{RMS}	16	A
V_{RRM}/V_{DRM}	upto 1600	V
I_{TSM}	200	A
V_T @ 10 A, $T_J = 25^\circ\text{C}$	1.4	V
dv/dt	500	V/ μs
di/dt	150	A/ μs
T_J range	-40 to 125	$^\circ\text{C}$

Package Outline



Also available in SMD-220 package (series 16TTS..S)

Voltage Ratings

Part Number	V_{RRM} , maximum peak reverse voltage V	V_{DRM} , maximum peak direct voltage V	I_{RRM}/I_{DRM} 125°C mA
16TTS08	800	800	10
16TTS12	1200	1200	
16TTS16	1600	1600	

Absolute Maximum Ratings

Parameters		16TTS..	Units	Conditions			
$I_{T(AV)}$	Max. Average On-state Current	10	A	@ $T_C = 98^{\circ}\text{C}$, 180° conduction half sine wave			
I_{RMS}	Max. RMS On-state Current	16					
I_{TSM}	Max. Peak One Cycle Non-Repetitive	170		10ms Sine pulse, rated V_{RRM} applied			
	Surge Current	200		10ms Sine pulse, no voltage reapplied			
I^2t	Max. I^2t for fusing	144	A^2s	10ms Sine pulse, rated V_{RRM} applied			
		200		10ms Sine pulse, no voltage reapplied			
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ for fusing	2000	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reapplied			
V_{TM}	Max. On-state Voltage Drop	1.4	V	@ 10A, $T_J = 25^{\circ}\text{C}$			
r_t	On-state slope resistance	24.0	$m\Omega$	$T_J = 125^{\circ}\text{C}$			
$V_{T(TO)}$	Threshold Voltage	1.1	V				
I_{RM}/I_{DM}	Max. Reverse and Direct	0.5	mA	$T_J = 25^{\circ}\text{C}$	$V_R = \text{rated } V_{RRM} / V_{DRM}$		
	Leakage Current	10		$T_J = 125^{\circ}\text{C}$			
I_H	Holding Current	Typ.	Max.	mA		Anode Supply = 6V, Resistive load, Initial $I_T = 1A$ 16TTS08, 16TTS12 16TTS16	
		–					100
		100					150
I_L	Max. Latching Current	200	mA	Anode Supply = 6V, Resistive load			
dv/dt	Max. Rate of Rise of off-state Voltage	500	V/ μs				
di/dt	Max. Rate of Rise of turned-on Current	150	A/ μs				

Triggering

Parameters	16TTS..	Units	Conditions
P_{GM} Max. peak Gate Power	8.0	W	
$P_{G(AV)}$ Max. average Gate Power	2.0		
$+I_{GM}$ Max. peak positive Gate Current	1.5	A	
$-V_{GM}$ Max. peak negative Gate Voltage	10	V	
I_{GT} Max. required DC Gate Current to trigger	90	mA	Anode supply = 6V, resistive load, $T_J = -65^\circ\text{C}$
	60		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	35		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
V_{GT} Max. required DC Gate Voltage to trigger	3.0	V	Anode supply = 6V, resistive load, $T_J = -65^\circ\text{C}$
	2.0		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	1.0		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
V_{GD} Max. DC Gate Voltage not to trigger	0.2		$T_J = 125^\circ\text{C}$, $V_{DRM} = \text{rated value}$
I_{GD} Max. DC Gate Current not to trigger	2.0	mA	$T_J = 125^\circ\text{C}$, $V_{DRM} = \text{rated value}$

Switching

Parameters	16TTS..	Units	Conditions
t_{gt} Typical turn-on time	0.9	μs	$T_J = 25^\circ\text{C}$
t_{rr} Typical reverse recovery time	4		$T_J = 125^\circ\text{C}$
t_q Typical turn-off time	110		

Thermal-Mechanical Specifications

Parameters	16TTS..	Units	Conditions
T_J Max. Junction Temperature Range	-40 to 125	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-40 to 125		
R_{thJC} Max. Thermal Resistance Junction to Case	1.3	$^\circ\text{C/W}$	DC operation
R_{thJA} Max. Thermal Resistance Junction to Ambient	62		
R_{thCS} Typ. Thermal Resistance Case to Heatsink	0.5		Mounting surface, smooth and greased
wt Approximate Weight	2(0.07)	g(oz.)	
T Mounting Torque	Min.	6(5)	Kg-cm (lbf-in)
	Max.	12(10)	
Case Style	TO-220AC		

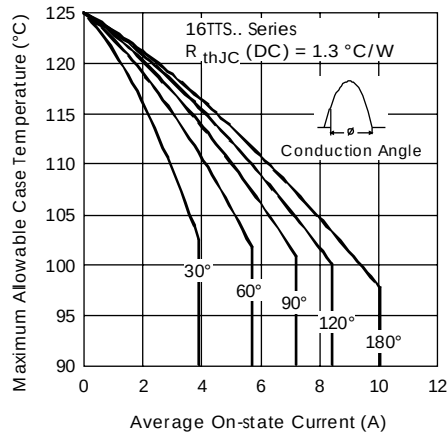


Fig. 1 - Current Rating Characteristics

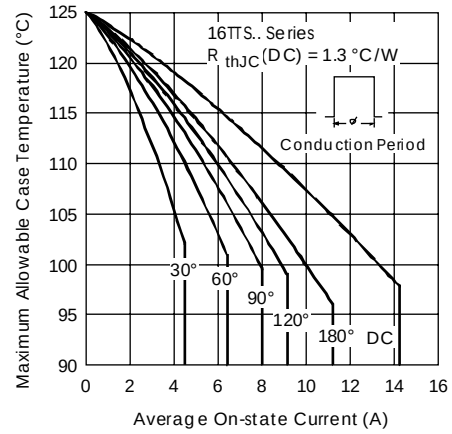


Fig. 2 - Current Rating Characteristics

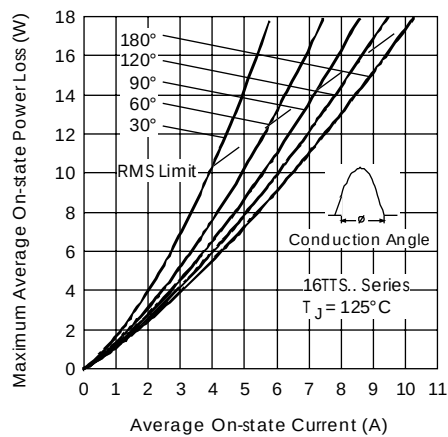


Fig. 3 - On-state Power Loss Characteristics

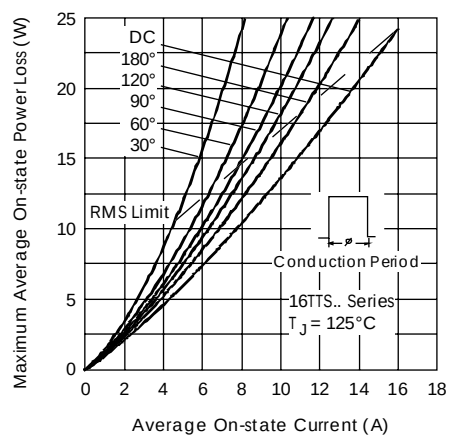


Fig. 4 - On-state Power Loss Characteristics

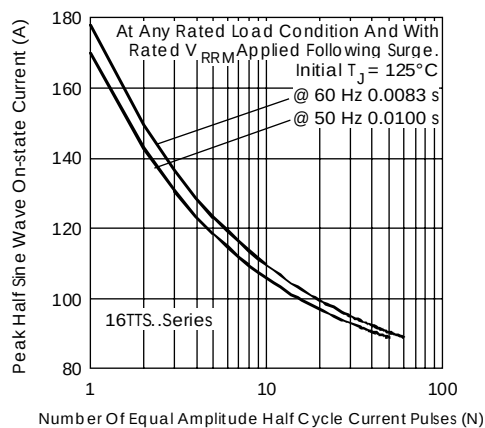


Fig. 6 - Maximum Non-Repetitive Surge Current

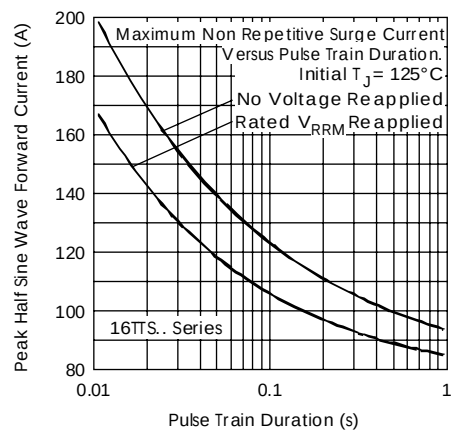


Fig. 7 - Maximum Non-Repetitive Surge Current

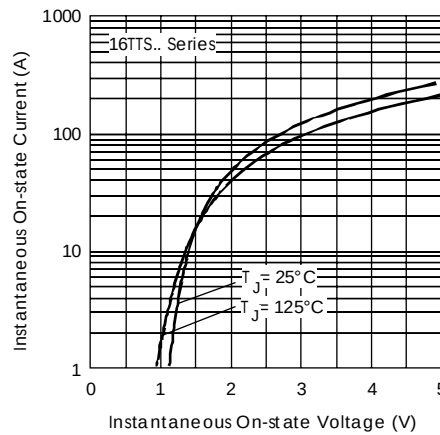


Fig. 7 - On-state Voltage Drop Characteristics

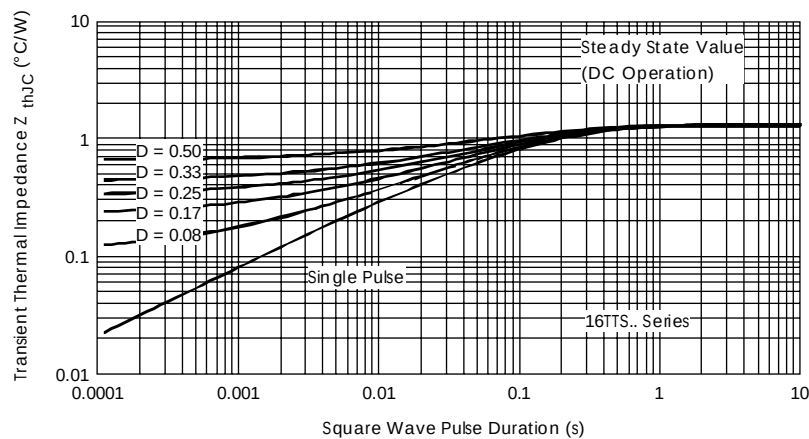


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

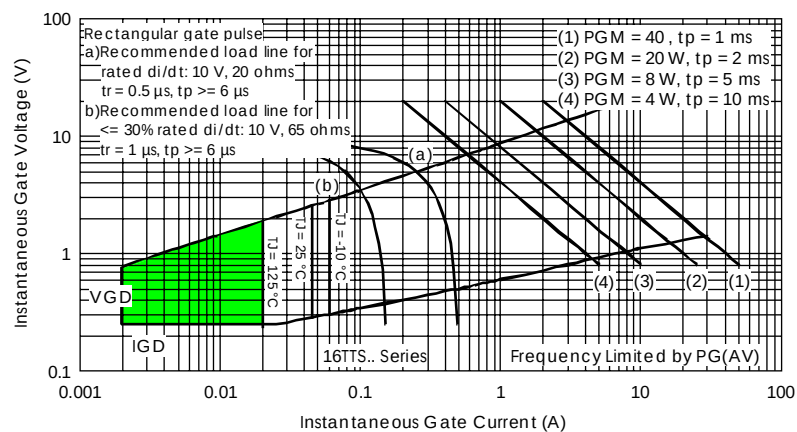
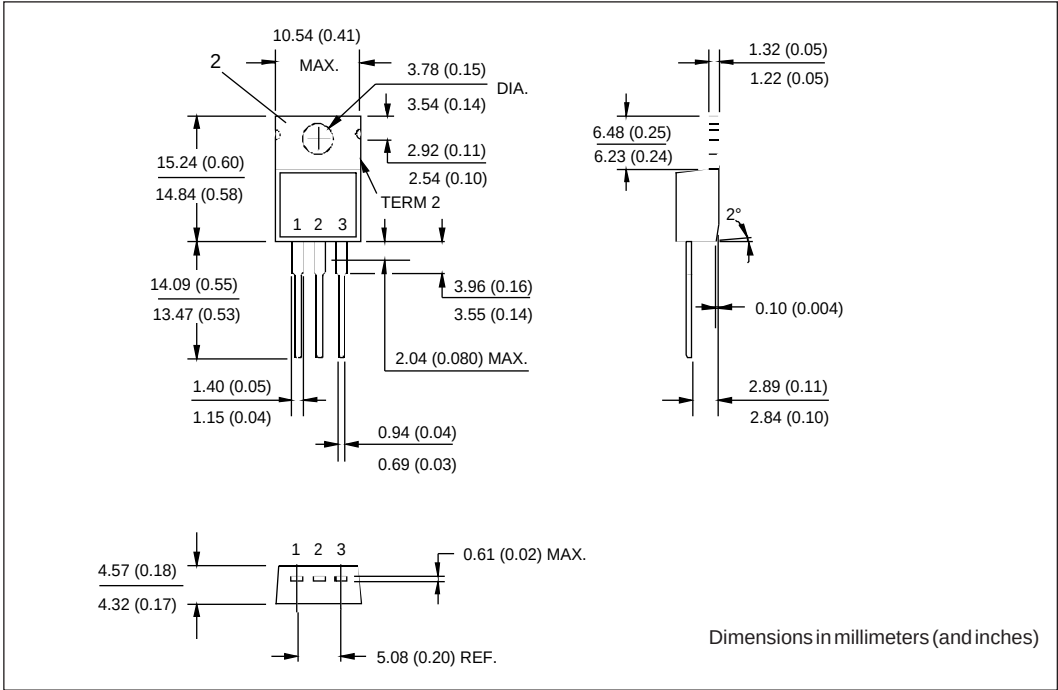
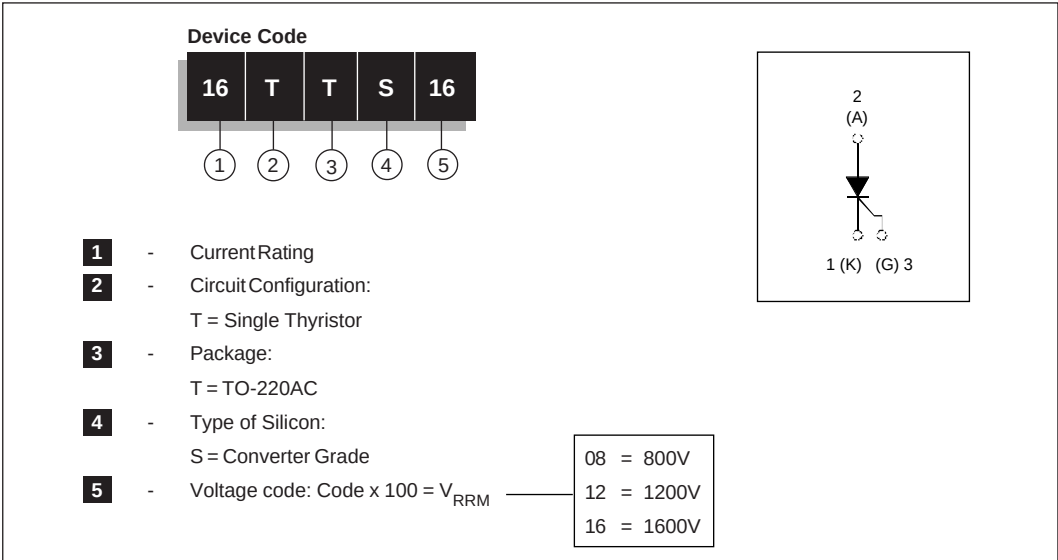


Fig. 9 - Gate Characteristics

Outline Table



Ordering Information Table



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